PALÆOZOIC CRINOIDS

AT the seventh and last of the ordinary monthly meetings of the Montreal Natural History Society for the season 1870-71 a communication on a Mineral Silicate injecting Palæozoic Crinoids was made by Dr. T. Sterry Hunt. The author described a gray granular palæozoic limestone from New Brunswick, which had been examined by Dr. Dawson, and found to consist almost entirely of the comminuted remains of brachiopod and gasteropod shells, crustacea, and the joints and plates of crinoids, cemented with a little calcareous spar. The crinoidal remains were, however, found to have their pores filled with a peculiar silicate, which is exposed in relief when the surface of the limestone is attacked by an acid, and then appears as a congeries of small cylindrical rods or bars, anastomosing and forming a beautiful network which, under a magnifying glass, exhibits a frosted crystalline surface, and resembles the variety of aragonite known as *flos ferri*. This silicate, which also fills small interstices among the other calcacereous fragments making up the limestone, is greenish in colour and forms about 5 per cent. of the rock. Though insoluble in dilute acids, it is completely decomposed by strong acids, and is found to be a hydrous silicate of ferrous oxide and alumina, with some magnesia and a little alkali, closely allied to fahlunite and to jollyte. The results of its analysis will appear in *Silliman's Journal* for May. Dr. Hunt remarked that this process of infiltration, by which the minute structure of these palæozoic crinoids has been preserved, was precisely similar to that seen in the glauconite casts of more modern foraminifera, and in the Eozöon of older times. This ancient calcacerous rhizopod, though most frequently preserved by serpentine, had been shown, both by himself in Canada and by Hoffmann in Bohemia, to be in some cases injected by silicate related in composition to that of these crinoids. The great class of silicates of which serpentine, loganite, pyrosclerite, fahlunite, and jollyte are members, are generally described as the results of pseudomorphic changes of pre-existing silicates or carbonates; but Dr. Hunt maintains them to be original aqueous depositions, similar in their origin to the related mineral glauconite; a view now adopted by such investigators as Naumann, Scheerer, Gümbel, and Credner. These facts have an important bearing on the Eozöon Canadense of Dawson, the organic nature of which, though almost universally admitted by zoologists and mineralogists, is nevertheless still questioned by Messrs. King and Rowney. These gentlemen object that the ancient rocks in which Eozöon is found are what are called metamorphic strata, which have been, according to them, subjected to pseudomorphic changes, and therefore the Eozöon may be the result of some unexplained plastic force, which has fashioned the serpentine and other mineral silicates into forms so like those of foraminiferal organisms as to deceive the most practised observer. This was going back to the notions of those who, rather than admit that mountains had been formed beneath the sea, imagined that the fossil shells which they often contain were not the real shells of animals, but the result of some freak of nature. The argument of Messrs. King and Rowney that the Eozöon rock is a result of pseudomorphic alteration because it contains serpentine, is a begging of the question at issue, by asking us to admit that the presence of serpentine is an evidence of metamorphic change, which is denied. The specimens of this organic limestone, with its injected crinoids, differs from Eozöonal rock only in containing at the same time recognisable fragments of other organic remains, and in presenting in its injected portions the differences which distinguish the minute structure of a crinoid from that of a calcareous rhizopod.

Principal Dawson has verified the observations of Dr. Hunt by microscopic examinations. Crinoids in the fossil state are generally filled with carbonate of lime so as to obliterate their pores. The infiltrating silicate in the present case, however, shows, especially in decalcified specimens, that these ancient crinoids closely resembled in their minute structure the modern forms lately studied by Dr. W. B. Carpenter and Prof. Wyville Thomson, especially *Comatula*. The process of filling up the porous calcareous skeleton of the crinoids has been clearly shown to be prior to the cementing and consolidation of fragmentary limestone.

To this we may add that fragments of the calcareous skeleton of Echinoderms infiltrated with silicates have been detected by Dr. Carpenter, together with *Polystomellæ* and many other foraminifera similarly infiltrated, in Capt. Spratt's dredgings from the Ægean. On placing these fragments in dilute acid, the calcareous network of which Dr. Carpenter nearly thirty years ago showed the skeletons of all Echinoderms to be made up, is dissolved away; and a perfect model is left in green or ochreous silicates, of the sarcodic network, with which, in the living state, the interspaces of the calcareous network are occupied. Dr. Carpenter, however, objects to the term "infiltration" as expressive of the process by which the replacement of the sarcodic substance by silicates has taken place. As this process is going on at the present time on the ordinary sea-bottom, he thinks that it can only be attributed to a process of "substitution," in which the decomposition of the sarcodic substance performs an essential part. Whatever may be regarded as chemically the most probable explanation of the replacement, it will be obviously the same for the ancient as for the modern examples of the process.

NOTES

AT the Anniversary Meeting of the Royal Geographical Society held on Monday last, the address of the retiring president, Sir R. I. Murchison, was read by the secretary, Mr. Clements Markham, Sir Roderick thus closing an occupancy of the presidential chair extending over sixteen years. He is succeeded by Sir Henry Rawlinson. The Founder's Medal was on the same occasion awarded to Sir R. Murchison in recognition of the eminent services he had rendered to geography during his long connection with the society, in the course of which he had been associated with every exploring expedition for the last thirty years. The Patron's or Victoria Medal was presented to Dr. A. Keith Johnston for his long-continued and successful services in advancing geography. We regret to find that the retiring president found it necessary to send a letter to the secretary forbidding any hope that he would be able very soon to take an active part in the proceedings of the society, his progress towards complete recovery being slow. At the annual dinner which followed, the Dean of Westminster expressed a hope that we might yet see the foundation of a professorship of geography at each of the universities.

AT the Anniversary Meeting of the Linnean Society, held yesterday, Mr. Bentham delivered his annual address, which we hope to have an early opportunity of giving to our readers. Mr. Bentham was re-elected to the office of President, Mr. Wilson Saunders of Treasurer, and Messrs. F. Currey and H. T. Stainton of Secretaries, and the following gentlemen, in addition, were elected members of the Council for the ensuing year: Mr. John Ball, F.R.S., Mr. Alfred W. Bennett, Mr. J. J. Bennett, F.R.S., Mr. George Busk, F.R.S., Mr. F. Ducane Godman, Dr. J. D. Hooker, F.R.S., Prof. M. A. Lawson, Mr. Henry Lee, Mr. S. J. A. Salter, F.R.S., Dr. J. Lindsay Stewart, and the Rev. Thomas Wiltshire.

THE Board of Natural Science Studies for the Natural Science Tripos of the University of Cambridge has issued a set of schedules indicating the subjects to which the examination in 1872 and following years will be confined, and also those subjects which are suitable for the questions of the first six papers in the examination, as follows:—(1) Chemistry and certain other branches of Physic; (2) Mineralogy; (3) Geology; (4) Botany, Comparative Anatomy, Physiology, and Zoology, including (A) Morphology; (B) Physiology; and (C) Distribution.

The Slade Professorship of the Fine Arts referred to in our last number has been established in connection with University College, London.

The University of London has decided on the appointment of two assistant examiners in Experimental Philosophy at an annual salary of 25*l.* each; and a salary of 30*l.* in place of 25*l.* to each of the assistant examiners in Chemistry; as it is thought expedient to charge them with the superintendence of the practical and laboratory examinations at the preliminary scientific and first M.B. examinations.

Dr. C. R. A. Wright has been appointed Lecturer on Chemistry and Practical Chemistry at St. Mary's Hospital, *vice* Dr. Russell, who is now the Professor of Chemistry at St. Bartholomew's Hospital.

A lecture was delivered on May 17 by Dr. W. B. Carpenter, F.R.S., in the Comparative Anatomy Lecture Room of the New Museum, Cambridge, on the results of the Deep Sea Explorations during the last summer. After a brief *résumé* of the results of the deep-sea dredging up to the end of 1869, the lecturer gave an account of the configuration of the Mediterranean basin, of the singular difference in the laws of temperature at various depths in it and in the neighbouring Atlantic, of the proof of an outward current flowing beneath the surface in-current in the Straits of Gibraltar, of the additional proof of a great oceanic circulation between the waters of Polar and Equatorial regions, which he considered to have a far greater effect on climate than the Gulf Stream, and upon the fauna of the deeper parts of the Lusitanian seas, concluding with some remarks upon the comparatively azoic condition of the Mediterranean basin and the bearing of this upon some geological questions. The lecture was most attentively listened to by a crowded audience, and at the conclusion a vote of thanks, proposed by the Vice-Chancellor and seconded by the venerable Prof. Sedgewick, was carried by acclamation.

The number of the members of the French Academy of Sciences is fast diminishing. The late Sir John Herschel was a foreign associate member, which is a very rare honour, as there can only be five such members created. Profs. Faraday and Graham were amongst the foreign associates.

The distinguished members of the medical profession have mostly deserted Paris, although there are many thousand sick and wounded to be taken care of within the walls of the unhappy city. But there are also sick and wounded by scores of thousands outside. Amongst the distinguished practitioners who are in Paris we see the names of M. Broca, the celebrated anthropologist, Lassergue, Maison Neuve, and Axenfeld. But although some professors of the École de Médecine are to be found amongst these medical gentlemen, the School of Medicine is closed. It appears, however, that an irregular course of lectures is kept up open at Hospital Beaujon, which hospital does not belong to the Government.

M. Elisée Reclus, the newly-appointed director of the National Library, asked from his subordinates to give their adhesion to the Commune. Almost everyone refused, and were instantly dismissed.

The Annual Conversazione given by the President of the Institution of Civil Engineers will be held on Tuesday evening, June 6th. A collection of Models of Engineering Construction, of small and light pieces of Mechanism, and of Scientific Instruments, as well as of Works of Art, by ancient and modern masters of eminence, depicting some engineering work, object, or matter of interest, as "a bridge, lighthouse, aqueduct, or harbour, &c., set in its appropriate landscape," will be exhibited.

The following Excursions have been arranged by the Geologists' Association for the ensuing month:—Excursion to Yeovil: Monday, May 29, and three following days, under the leadership of Prof. Buckman and Mr. Lobley, including the following points of interest: Yeovil Junction (Fine Section of Upper Lias Sands); Closeworth (Rectory), inspection of large collection of Mesozoic fossils, belonging to Rev. E. Bower, M.A.; Babylon Hill (Inferior Oolite); Halfway House (Inferior Oolite, very fossiliferous); Sherborne (Inferior Oolite, very fossiliferous); Bradford Abbas (Inferior Oolite); inspection of Prof. Buckman's collection; Handford Hill (Upper Lias Sands); Ham Hill (Inferior Oolite, very large quarries, ancient encampment); South Petherton (Middle and Upper Lias, very fossiliferous); Chard (Chloritic Marl, base of Chalk series). Should time permit, Crewkerne (Inferior Oolite) will be visited on return. Excursion to Ilford: Saturday, June 17, under Mr. Henry Woodward.—On arriving at Ilford, the Mammalian beds in the Newer Pliocene deposits at this place will be inspected, and subsequently a visit will be paid to the residence of Sir Antonio Brady, who has kindly invited the Association to inspect his fine collection of stone implements and mammalian remains. Excursion to Caterham: Saturday, July 1, under the management of Mr. Lobley. Fine Sections of the Upper Chalk are exposed in the neighbourhood of Caterham. Excursion to Warwick: Monday and Tuesday, July 10 and 11, under the Rev. P. B. Brodie.—On arriving at Warwick the party will visit the Museum, in which will be found the finest collection of Triassic fossils in England. The Keuper sections near the town will then be inspected. At Wilmcote very interesting seetions of the Insect Bed of the Lower Lias are exposed. Should time permit, visits will be paid to the Permian sections at Kenilworth, and to the fine Lower Lias section at Harbury.

We learn from the *British Medical Journal* that the Committee of the College of Physicians has produced a scheme of amalgamated examination for consideration by the Joint Committee. Under this scheme, the examination would be a minimum examination, and essential for all the universities and licensing bodies of Great Britain. It would be carried out by examiners appointed by a Joint Committee, with a sole view to the fitness of such examiners. The fee for the joint examination would be one calculated only to cover the expenses—about fifteen guineas. The licensing bodies would not confer any licence except upon those who had passed the examination, and each would fix the fee for its licence. If the College of Surgeons will on its part accept this scheme, it will establish its claim to be considered sincere in the cause of medical reform.

We have received the first four fasciculi of a new Italian Journal of Chemistry, edited by Prof. Cannizarro, of the University of Palermo. It contains a number of original articles by the editor, Dr. U. Schiff, Profs. Lieben and Rossi, and other well-known chemists, translations of important foreign papers, and an abstract of the proceedings of the chemical societies of Italy, Germany, and England.

The Scottish Arboricultural Society has just issued its volume of Transactions for the past year, edited by Mr. James Sadler. The objects of the society are the promotion of the Science of Arboriculture in all its branches by periodical meetings of the members for the reading of papers, by offering prizes and reports on the practical operations of forestry, and publication of the same; and by such other means as may be found advisable; and it numbers among its members most of the botanists, arboriculturists, and practical foresters of Scotland. In the present volume are a number of practical essays on various points of tree cultivation, and for the current year no fewer than nineteen prizes are offered, the competition for some being limited to working foresters and woodmen.

REFERRING to the statement of the disappearance of Aurora Island (one of the New Hebrides group), recently printed in the American newspapers, Mr. Tryon exhibited to the Conchological Section of the Academy of Natural Sciences of Philadelphia, at their meeting on January 5th, two species of shells from the collection, supposed to be peculiar to this island, remarking that in the event of the reported submergence of the island being confirmed, these must be classed among the lost species. In his report on the mollusca collected by Wilkes's U.S. Exploring Expedition, we learn from the *American Naturalist*, Dr. Gould gives the following account of Aurora Island :—"The little island of Metia, or Aurora Island, to the northeastward of Tahiti, is one of peculiar interest. It is a coral island which has been elevated two hundred and fifty feet or more, and has no other high island near it. On it were found four small land shells belonging to three genera, viz., *Helix pertenuis*, *Helix Dædalea*, *Partula pusilla*, and *Helicina trochlea*. None of these were found upon any other island. They seem to have originated there, after the elevation of the island, and have a significant bearing upon the question of local and periodical creations in comparatively modern times."

IN these high-pressure days, it is astonishing what a saving in money and temper results from an exact punctuality. One would have thought that in every town which possesses a railway station, precise London time would be kept by the public clocks. This, however, appears to be by no means the case. To remedy this inconvenience, we notice that the Rev. H. Cooper Key is urging on the authorities of Hereford the importance of a daily time signal, preferring a time-gun to the dropping of a ball, as more certain to arrest attention. Certainly every town of the size of Hereford ought to have some means of keeping correct time.

A SLIGHT shock of earthquake was felt in Salvador in Central America on the 24th March, $1^h 45^m$. On the night of the 30th there were two shocks, with the sky clear and the moon bright. The Salvador earthquake very nearly coincides with two very severe shocks felt all over the Republic of Chile on the 25th March. Since then other shocks have been felt. In Valparaiso the first earthquake occurred at 11.5 A.M. and lasted about a minute, there being no previous noise. A little after 12 a slight shock was experienced, another shortly after 1, and at 5.30 P.M., a shock as strong as that of the morning ; walls were cracked.

ON the 26th March there were slight shocks of earthquake at Arequipa, in Peru.

WE have been favoured by the president of the Halifax (Nova Scotia) Institute of Natural Science with a report of their most recent meetings, which will be found in another column. We congratulate the Institute on the good work done by its members in illustrating the natural history, past and present, of the colony.

THE *Pioneer* of Allahabad contains a communication on snake bites. The writer is inclined to believe there is no antidote, but he thinks it useful to put on record an experiment. About three years ago he saw a bullock which had been bitten by a snake and was lying prostrate on the ground retching. Having heard from an old Brahmin that aniseed soonf was a remedy, he was induced to try it. He mixed aniseed 2 chittacks, pepper $\frac{1}{4}$, aniseed leaves 1, aniseed bark 1. This was administered internally with great difficulty down the bullock's throat and externally. In a few minutes the bullock lifted his head, in an hour he stood up and began to chew, and in two hours was all right.

PROF. WYVILLE THOMSON'S INTRODUCTORY LECTURE AT EDINBURGH UNIVERSITY*

IT is too often the first duty of a professor on taking office, to lament the loss of a predecessor who has lately left a blank in the ranks of literature or of science. I am happily relieved from this sad task, for although my friend, Dr. Allman, has found it necessary to retire from the active duties which he has performed so well for many years, his retirement may be looked upon as in a certain sense a gain to science, since he now enjoys a greater amount of leisure to carry on those admirable researches in one of the most difficult and obscure provinces of biology, which have already placed his name high on the roll of those who have added to the store of human knowledge. Although I sincerely trust it may be long before the inevitable time arrives for summing up the labours of George Allman, I believe I may be pardoned if I say a few words about the nature and method of his work, for there is no sounder example which I can cite for your emulation and my own. While keeping pace with the rapid advance of knowledge, and contributing to the general literature of biology the intelligent commentaries and criticisms of an accomplished teacher, Dr. Allman has steadily pursued for many years one special line of research. Whatever he takes up he works out thoroughly and well. His results are fearlessly quoted in all languages as entirely reliable. His straightforward statements and exact descriptions are warped by no preconceived theories, and need no revision or corroboration, and his beautiful drawings are as true to nature as the objects themselves.

No one appreciates more than I do the value of well-founded generalisations. They are the silken threads on which the pearls of truth are strung, and without them we could never realise the full beauty of the gems, their relative value, and their subtle harmonies in form and lustre and tone of colouring ; but the first thing is to dive for the pearls, and a good pearl-diver is immortal !

There is another matter to which I wish to refer, and I do so with unmixed pleasure—the appointment of my friend Prof. Geikie to a separate Chair of Physical Geology and Mineralogy in the University. You are all aware that it is to the munificence of Sir Roderick Murchison that this most valuable addition to our teaching staff is due. Sir Roderick Murchison is a Scotchman who has done more to advance the knowledge of geological and geographical science than any other man living. It is needless for me to speak in terms of eulogy of this last benefit which he has conferred upon the cause of scientific instruction in his native country, but I could not from feelings of personal gratitude allow this opportunity to pass of saying that it is to Sir Roderick Murchison that I owe my first encouragement and assistance in Natural Science ; and, like all who have received favours at his hands, I have found him a kind and steady friend through life.

We have now in the University three distinct departments of Natural Science, and as it taxes any man's energies to the utmost to keep up with the rapid advance of any one of them, it is of incalculable advantage that their teaching should be in different hands. Broadly speaking, Prof. Geikie now takes the inorganic kingdom of Nature, while Dr. Balfour and I divide biological science between us—Dr. Balfour taking the vegetable kingdom, and I the animal kingdom chiefly. The three subjects, however, meet and inosculate at every point, and the more one branch derives illustration from the other the better. This is especially the case with reference to Physical Geology, and the two departments of biology go between them, and demand full illustration from each. A mass of facts has of late years been developed, which group themselves into a special science of boundless interest—the Science of Palæontology. Still there can be no doubt that Palæontology is simply the biology of the present carried back continuously into the past. I will accordingly, with Prof. Geikie's full concurrence, incorporate pure Palæozoology with my Zoology course, and my colleague, Prof. Balfour, will doubtless do the same by Palæophytology ; and we shall both materially trespass upon the domain of Prof. Geikie for the necessary illustration which his special subject affords, fully aware that he must make even heavier requisitions upon us.

Gentlemen, I have already alluded to the division of the Natural Science group of subjects into three—the study of inorganic nature from a natural history point of view, and the study

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* Introductory Lecture to the Natural History Class. By Prof. Wyville Thomson, LL.D., D.Sc., F.R.S.